Remarks/Arguments

The Office Action of December 7, 2006 has been reviewed and carefully considered. Applicant respectfully requests consideration of the following remarks in light of the present amendments.

The Applicant gratefully acknowledges the Examiner's entry of the Amendment accompanying the submission of September 22, 2006. The Applicant respectfully reminds the Examiner that the complete listing of claims included in the Amendment of September 22, 2006 supersedes all previous listings of claims, and that any previous amendments to the claims are included in the amendment of September 22, 2006.

Furthermore, it seems that the several of the Examiner's comments and objections are verbatim copies of the comments presented by the Examiner in the May 26, 2006 Final Office Action. Each of these comments was addressed in the Office Action Response dated September 22, 2006. Many of the previously presented remarks on the Examiner's comments have *not* been addressed by Examiner at this point, and the Examiner's comments remain in the present Office Action.

Applicant respectfully requests the consideration of the previously submitted remarks, and reiterates remarks previously submitted in the Office Action Response of September 22, 2006.

Regarding the Examiner's comments in general, the Examiner, in several instances, has stated that it would be impossible to display a 3-D image on a display screen. Additionally, the Examiner has repeatedly asserted that "there is no such thing as

a 3D image by itself. Every image is 2D in nature; it is the optical illusion that makes the 2D image to be displayed with 3D effect." From this passage, the Examiner seems to infer that the present invention presents an image that has actual depth. This is not the case.

The present invention shows multiple perspectives of an image on a flat, two dimensional screen. Claims 1, 21, 27, 41 and 57 have been amended to recites "a *perceived* 3D image" to more clearly reflect that the three dimensional effect is an *effect,* and not the construction of a three dimensional object. No actual three dimensional sculpture of an actual three dimensional object is projected into empty space. Instead, the *appearance* of three dimensionality is created by application of the present principles. It is well known in the art, and even outside the art, that referring to an image as "three dimensional" does not require *actual* depth in the image, but the impression or appearance of depth.

The Examiner has recognized that producing a three dimensional image from a two dimensional surface is possible on page 4, first full paragraph of the Office Action dated December 7, 2006. There, the Examiner states that "3D image is really an illusion to eyes generated by either the combination of the specifically arranged images (i.e. stereo-related images) and optical arrangement or holographically recording 3D objects as a hologram and replay the hologram." The Examiner's incorrect assertion that stereo images or recorded holograms are the only way to achieve a three dimensional image notwithstanding, it is well known in the art that stereo related images used in stereoscopy and the film substrate for recording holograms are both two dimensional surfaces. Thus,

the Examiner has admitted that a three dimensional image may, in fact, be produced by with a two dimensional surface.

Furthermore, Applicant respectfully asserts that the Examiner is selectively interpreting the term "three dimensional" absolutely literally, and not in the colloquial sense, as is in the present context. While it is true an image on a two dimensional surface is not *actually* three dimensional, and does not actually have measurable *physical* depth, an image commonly referred to as three dimensional is understood from the plain English meaning of the term, may *appear* three dimensional.

The term "three dimensional, 3-D, three-D and the like, are all so well known outside the art that even basic dictionaries include similar definitions for the adjective "three dimensional." The following definitions for "three dimensional" were all taken from various dictionaries available online:

"giving the illusion of depth or varying distances — used especially of an image or a pictorial representation on a two-dimensional medium when this illusion is enhanced by stereoscopic means" – "three dimensional"; *Miriam Webster Online.*

"having, or seeming to have, the dimension of depth as well as width and height." "three dimensional." *Dictionary.com Unabridged (v 1.1).* Random House, Inc. 05 Mar. 2007.

"having or appearing to have extension in depth." "Three-dimensional." *The American Heritage® Dictionary of the English Language, Fourth Edition.* Houghton Mifflin Company, 2004. 05 Mar. 2007.

Thus, it would be obvious to one skilled in the art, as well as any layperson, that referring to an image as three dimensional does not require actual depth within the image. Only the *appearance* of depth is required for an image to properly be termed three dimensional.

The present principles create the *appearance* of depth by taking advantage of the parallax created by the horizontal separation of a human's eyes. In particular, FIGs. 5-8 of the specification disclose how, using the presented principles, a three dimensional object, having actual depth, may be portrayed on a flat, two dimensional screen. Figs. 3-4 show how the aperture plate allows a single viewer's eyes perceive different parts of the display screen when a single aperture is open. The different areas of the display screen seen by each eye convey different image data to each eye. The difference in perspective perceived by the different eyes of an observer is interpreted as the depth, giving the viewer the *impression* that the image has depth. Thus, in the context of the present principles, a three dimensional image can be displayed using a two dimensional screen.

Objections to Amendment of April 3, 2006 and Amendment of September 22, 2006

Claims 1-52 and 57-67 stand rejected under 35 U.S.C. 112, first paragraph

The Examiner has objected to the Amendment of April 3, 2006 under 35 U.S.C. §132(a). The Examiner has also objected to the Amendment of September 22, 2006 under

35 U.S.C. §132(a). Applicant respectfully traverses these rejections. Applicant respectfully draws the Examiner's attention to MPEP §2163, which states that "if new subject matter is added to the *disclosure*, whether it be in the abstract, the specification, or the drawings, the examiner should object to the introduction of new matter under 35 U.S.C. 132 or 251 as appropriate", and that "[i]f new matter is added to the claims, the examiner should reject the claims under 35 U.S.C. 112, first paragraph - written description requirement."

As the Examiner has acknowledged that the claims, and not the abstract, specification or drawings were amended by these amendments, Applicant respectfully asserts that the objections of both amendments under 35 U.S.C. §132(a) is improper. Furthermore, as no matter was introduced into the specification, denial of the entry of these amendments is improper as well.

Applicant assumes that the Examiner intended to object to the claims as amended on April 3, 2006 and September 22, 2006 under 35 U.S.C. §112, first paragraph, in conformance with MPEP §2163. Furthermore, the Applicant respectfully points out that the Examiner has entered all of the previously presented amendments over the Examiner's own objection that the amendments introduce new matter.

In particular, the Examiner has objected to the claims 1, 21, 27, 29, 42 and 57 including the term "a displayed 3D image", and claims 21, 42, 57 and 68 for including the phrase "simultaneously viewable."

Regarding claims 1, 21, 27, 29, 42, and 57, Applicant respectfully reiterates the above explanation of the term "three dimensional", and Applicant's numerous previous discussions of the workings of the present principles, as claimed. Furthermore, these

claims have been amended to read "a *perceived* 3D image" instead of "a *displayed* 3d image", which should clarify for the Examiner that the image itself dues not possess depth.

Presenting different data to each eye to give the illusion of depth is well known to the art. As disclosed in the background portion of the specification, and discussed in depth in the Remarks accompanying the Amendment of September 22, 2006, presenting different visual data to each eye to give the *illusion* of depth, is well known in the visual arts as a method for presenting three dimensional imagery. Techniques such as the Anaglyph, stereoscope or polarized filter methods require the use of special glasses to separate data displayed in a single image and present different visual data to each eye.

As shown in Figs 3-4, a person viewing a screen is capable of perceiving differrnt visual data with each eye. At its simplest, an aperture plate is placed between the viewer's eyes and a visual display. When a single aperture is opened, because of the viewer's parallax, or distance between the eyes, each of the viewer's eyes sees a different part of the display screen. The aperture is then closed, the display screen is changed to reflect another portion of the desired image, and another aperture is opened to allow each of the viewer's eyes to see another part of the final three dimensional image with each eye, where each eye views different parts of the display screen. Rapidly opening aperture shutters in a predetermined sequence permits the display of a sequence of complete visual frames, with the visual display changed such that new visual image data is displayed each time a new aperture shutter is opened. Each of the shutters are opened and closed rapidly enough that the human eye will not perceive the different shutters opening and closing, and the visual data will be translated into a single complete image frame in the viewer's

mind. Furthermore, by rapidly showing complete image frames in sequence, the viewer will perceive a single, seamless visual presentation. The differences in visual data presented to each eye will give the viewer's mind the impression that the viewed data is three dimensional. This is the Aperture-view Equivalence (AVE) discussed in paragraphs 0055-0058 in the specification.

Thus, an image with *apparent* three dimensionality is displayed to the user. Each opening of the aperture plate can be similar to a single pixel being shown on a standard, known, CRT monitor. As is known in the art, a CRT monitor displays each pixel in successive order. However, along with the residual glow of the CRT screen phosphors, the persistence of human vision allows the CRT monitor to build each frame one pixel at a time. The present principles use, in part, a similar concept. As claimed, the present principles are directed to building three dimensional displayed image one pixel at a time. Each aperture in the aperture plate can be analogized to each individual pixel in a standard CRT monitor. The apertures are opened and closed sequentially, allowing the construction of the three dimensional image one aperture, or "pixel", at a time. However, in contrast to a standard CRT monitor, the visual data shown under the present principles at each "pixel", or aperture opening, is different for each eye. The display screen behind the aperture plate changes for each aperture opening. Therefore, when a single aperture opens, the right eye will perceive a different portion of the display screen than the left eye. Due to the small size of the apertures, only a small portion of the display screen is seen by each eye while a single aperture is open. When the aperture closes, the visual data displayed on the display screen is changed, and a second aperture is opened to display a second pair of image datum to the viewer's eyes, the second pair of image

datum coming from a different point in space with respect to the viewer's eyes. This process repeats across the affected area of the aperture plate. The sequential opening of apertures on a specific area of the aperture plate comprises a single frame of the displayed image. The process of repeatedly opening and closing the apertures in sequence results in sequential frames of the displayed image.

Regarding the Examiner's objection to claims 21, 42, 57 and 68, the Examiner has objected to the term "simultaneously viewable", and stated that "[a]n observer has only two eyes that can 'simultaneously' placed at two locations to view two different perspectives." The Applicant respectfully asserts that the Examiner is reading a limitation into the claim that does not exist, and was not implied. At the outset, the Examiner has recognized that each eye of an observer, or viewer, will see different perspectives of a display, as shown in FIGs. 3-4. Claim 21, for example, does not import or suggest any limitation that more than two viewing perspectives are required.

The Examiner has stated that "the same observer cannot simultaneously view more than two perspectives located at different spatial locations." The plain and ordinary meaning of the word "multiple" simply means more than one.

However, it should be further noted that a single observer may move in relation to the display screen to experience different display perspectives. Claim 21, for example, recites that the viewing perspectives are "simultaneously viewable", which permits the user to view from multiple viewing perspectives. Each viewing perspective need not be actually viewed by the viewer at the same time for the perspectives to *viewable*, as the language of the claims in question recite perspectives that are *capable* of being viewed, not necessarily *actually* being viewed.

Furthermore, multiple users may view the display, and since two persons may not occupy the same space, each of the multiple users would necessarily view the displayed image from different viewing perspectives. Applicant again draws the Examiner's attention to claim 21, which recites, *inter alia*, "the three dimensional display provides multiple different perspectives of a displayed 3D image which are simultaneously viewable from respective multiple different user viewing angles with respect to an open aperture." Nothing in this element requires that a single user view the different viewing perspectives. In fact, a large part of the utility and inventiveness of the present principles allows for a single display to be viewed by multiple viewers, simultaneously. The utility of the present principles is further enhanced by the ability of a user to move around with respect to the display to view different perspectives of the same image.

Thus, the language added to the claims through the Amendments of April 3, 2006 and September 22, 2006, and objected to by the Examiner, do not add new matter, and are fully supported by the specification and drawings. In light of the above clarifications, Applicant respectfully requests the Examiner's withdrawal of the objections to the previous, above cited amendments, and the withdrawal of the Examiner 35 U.S.C. §112/132 rejection of claims 1-52 and 57-67.

Claims 1-52 and 57-81 currently stand rejected under 35 U.S.C. §112, first paragraph

The Examiner has rejected claims 1-52 and 57-81 for failing to comply with the enablement requirement. Applicant respectfully traverses this rejection.

The Examiner has stated that a three dimensional display requires "certain optics to ensure the left eye perspective of the image goes to the left eye, and the right eye perspective goes the right eye of an observer."

Applicant respectfully draws the Examiner's attention to the aperture plate of the present principles as claimed. Specifically. Independent claims 1, 21, 68 and 76 recite "an aperture plate", while independent claims 42 and 57 recite a "parallax barrier" as an element of the respective claims. Applicant respectfully asserts that instead of *optics*, such as a lens or the like, ensuring that the left eye sees a different perspective than the right eye, the aperture plate, or parallax barrier, performs this function. Referring again to FIGs. 3-6, it can be clearly sent that an opening in the aperture plate allows the two different eyes of an observer to view different portions of the display screen.

Furthermore, the Examiner has stated that "certain essential elements and conditions are needed to achieve such features that are not in the claims to make the claims enabling." Applicant respectfully draws the Examiner's attention to 35 U.S.C. §112, first paragraph, which states that "[t]he specification shall contain a written description of the invention, and of the manner and process of making and using it..." Under this paragraph, the *specification* must be enabling, not the *claims*. The Examiner's assertion that the claims are not enabling is improper. Furthermore, an applicant is not required to recite every element of an invention within a single claim. This is why multiple independent claims and dependent claims are commonly submitted to the Patent Office.

Thus, in light of the foregoing, the withdrawal of the rejection of claims 1-52 and 57-81 under 35 U.S.C. §112, first paragraph, is respectfully requested.

Claims 1, 21, 27, 29, 42 and 57 currently stand rejected as unsupported by the specification

The Examiner has rejected claims 1, 21, 27, 29, 42 and 57 as for failure to teach elements of the claims in the specification. As stated above, a claim need not be enabling.

The Examiner has also stated that a "3D image is really an illusion to eyes generated by either the combination of specifically arranged images (i.e. stereo related images) and optical arrangement or holographically recording 3D object as a hologram and replay the hologram", and that the claims are not enabling because a stereoscopic or hologram was not explicitly recited in the claim. Applicant respectfully asserts that no such explicit recitation is required, as neither technique specifically applies in whole to the present principles.

The present principles do not employ traditional stereoscopic imaging, or traditional film recorded holography. As previously stated, the present principles make use of the stereoscopic nature of human vision, i.e. the perception of depth by humans due to the distance between each of a human's eyes.

Traditional stereoscopy presents two perspectives of three dimensional object, one to each eye of a viewer. The differences in the perspectives are interpreted by the human brain as depth. However, this technique only allows for a single final, three dimensional perspective of an object to be seen, even by multiple viewers.

Traditional, film recorded holography uses the phase change of light waves to give the illusion of depth. The advantage to this approach is that multiple viewers may perceive different perspectives of the displayed image, and a single viewer may move

with respect to the displayed image to view different perspectives. However, the method for recording a hologram involves the use of coherent light bouncing off of an object and striking a recording medium. The resulting recording is later used as a diffraction grating during playback, when coherent light is shown through the resulting diffraction grating to produce an image of a three dimensional object.

As stated above, the present principles are neither classic stereoscopy, nor classic holography. The final effect is holographic, meaning that a three dimensional representation of an object is displayed, i.e. a three dimensional image. The Response of April 3, 2006 specifically states that "[t]his is primarily because the 3D display device of the present invention is "holographic" *in nature* and NOT STERESCOPIC!" (emphasis added).

The Examiner has further stated that "It is really confusing now since it is not clear is the 3D image display is based on what technique merit?" and that "if merit is based on 'moving aperture' then none of the claims (close to 80) of them ever claim such a feature." To clarify, the moving aperture, the physical aperture is not moving, the apertures are opened and closed in sequence, meaning that the open aperture changes. The term "moving aperture" was used colloquially to denote that the open aperture is changed. Additionally, Applicant respectfully draws the Examiner's attention to Claim 2, which recites "a control system connected to said display screen and said aperture plate, said control system controlling sequencing of said display screen and predetermined apertures of said aperture plate to produce three-dimensional images." This is a recitation of the sequencing of the opening of the aperture shutters. However, Applicant respectfully asserts that such a recitation is not required in the claims, as the methods for

displaying the three dimensional image are clearly disclosed in the specification, and any claims are to be read in light of the specification.

The Examiner has stated that the term "holographic in nature" used to describe the present principles is confusing. The Examiner has recognized that holography allows the representation of an object as a three dimensional image. The present principles, as claimed, teach the display a three dimensional image, that is, an image having the illusion of depth. Therefore, since the present principles result in an image similar to that displayed by a hologram, the resulting image has the nature, or characteristics, of the resulting image produced by a hologram.

The Examiner has also stated that different viewer perspectives are not provided by the aperture, but are provided by having different image elements that representing different perspectives." The Applicant respectfully asserts that this is only partially true. The aperture allows the first eye of a viewer to see a certain portion of the display screen. The portion of the display screen, for example one pixel, seen by the first eye will be different than that of the viewer's second eye. The Examiner appears to assume that a single image is shown for all of the aperture openings. This is not the case. Image data representing different image perspectives is shown across *different angles* for each aperture opening. Thus, a multiple angles of perception are created, each angle providing a different perspective of the displayed image. Prior to each aperture opening, the displayed image is changed to create different perspectives of the displayed image.

The Examiner has further stated that the specification explicitly states that the device is stereoscopic. This is patently untrue. Nowhere in the specification are the claims or devices according to the present principles called stereoscopic. The device

simply takes advantage of the stereoscopic, or binocular, properties of human vision. However, as discussed at length above, and in the specification, the device embodying the present principles is not a traditional stereoscopic display. Furthermore, the Examiner has cited FIGs. 3-4 for the proposition that the specification explicitly states that the image display device is stereoscopic. However, FIGs. 3-4 merely show that human eyes are separated by some distances, and as such perceive different perspectives of any object. The Examiner has confused a stereoscopic device with a device taking advantage of human stereoscopy of vision.

In light of the foregoing discussion, the withdrawal of the rejection of claims 1, 21, 27, 29, 42 and 57 under 35 U.S.C. §112, first paragraph is respectfully requested.

Examiner's objection to the use of the term "solid state three-dimensional device"

The Examiner has further objected to the use of the term "solid state three-dimensional device" in the claims. However, this term only appeared in claim 53. Claim 53 was cancelled in the Response to the first Office Action, dated March 31, 2006. The cancellation of this claim has already been entered by the Examiner. The term "solid state three dimensional device" appears nowhere in any of the remaining claims. Should the Examiner have further objection to this term, the Applicant respectfully requests the Examiner's guidance as to where such a recitation of a "solid state three dimensional device" occurs.

Withdrawal of this objection is respectfully requested.

Examiner's objections to claim 12

The Examiner has rejected claim 12, stating that "the specification fails to teach how could the frame rate of the display device is capable of producing "at least 8 viewing angles: as recited in claim 12 (formerly claim 11)"

Applicant is unclear as to how the Examiner has correlated the frame rate with the viewing angles.

Claim 11 recites "wherein said display comprises a high frame rate video display device having a frame rate, wherein said display has a resolution capable of producing at least 8 different perspectives, each different perspective viewable from a different viewing angle", and claim 12 recites "[t]he three dimensional display device according to claim 11, wherein said frame rate comprises at least 150 frames per second."

From claim 11, it is the resolution producing the viewing angles, and not the frame rate. The resolution of the display permits a larger number of pixels to be displayed at any one time, allowing for data for more viewing perspectives to be displayed.

Applicant respectfully requests the Examiner withdrawal of the rejection of claim 12.

Examiner's rejection of the term "viewable operating range up to 180 degrees"

The Examiner has objected to the use of the term "viewable operating range up to 180 degrees". The Examiner appears to have somehow assumed that the angle needed is the angle between the viewer's eyes. This is not the case. The parallax of the screen is viewable from 180 degrees. Thus, a viewer may move their head in a 180 degree arc in front of the screen and still view the horizontal or vertical parallax. This should be clear from the exhaustive description given throughout the specification, and particularly in light of Figs. 3 and 4.

In light of the above clarification, Applicant respectfully requests the withdrawal of this rejection.

The Examiner's rejection of claim 76 for use of the term "hybrid screen"

The Examiner states that "claim 76 recites the phrase 'hybrid screen' but the specification fails how a hybrid screen is formed.

Paragraph 0087 states "The display 16 is preferably a high frame-rate video display device, and may employ any of a variety of display technologies. Examples of these technologies would be: High-speed liquid crystal display technology or Ferroelectric liquid crystal display (FLCD); Organic LED technology; Miniature LED technology, plasma, zero twist nematic LC; rear projection using multiple projectors or a DLP mirror chip (described below); or a *hybrid projection system based on the combination of any of these technologies.*" Furthermore, FIG. 14 illustrates a hybrid screen, and is discussed in paragraph 0088: "a rear projection hybrid system using multiple LCD video projectors back lit by sequenced strobe lights being used as an alternative to a single high-speed display screen 16."

Thus, the term hybrid screen is fully disclosed and taught in the specification. Applicant, therefore, respectfully requests the withdrawal of the Examiner's rejection of claim 76.

Claim Objections

At the outset, Applicant respectfully notes that all but one of the objections listed under the heading "Claim objections" in the Office action dated December 7, 2006 are

exactly the same objections presented in the Office Action of May 26, 2006. The first eight claim objections appear to be verbatim copies of the previous claim objections. The Examiner appears to have given no consideration of the previous amendments and arguments. The Applicant respectfully reiterates the remarks previously presented in the Office Action Response of September 22, 2006 made in support of withdrawal of the previous objections, and respectfully requests consideration of the following additional remarks.

Claims 1, 21, 27, 29, 42 and 57 are objected to for use of the phrase "different perspectives of a displayed 3D image..."

The Examiner has again asserted that the display of a three dimensional image is not possible on a two dimensional screen. As discussed above, the Examiner has recognized that such a display is possible, and that a three dimensional image will have the *appearance* of depth.

Thus, the Applicant respectfully requests the withdrawal of the Examiner's objection of the above cited claims.

Objection to the term "control system controlling sequencing of said display screen and said aperture plate..."

The Examiner has stated that there is no sequencing of the display screen that can be controlled. Applicant respectfully asserts that display sequencing not only exists, but that is an integral part of the present principles.

Paragraph 0060 states that "In order to reconstruct a truly three-dimensional image, however, the display screen 16 must represent an accurate two-dimensional projection with respect to the given aperture position. For this reason, every change in aperture position (d) requires a change in the 2-D image displayed. To clarify, the perspective from each different viewing angle to be made available requires the *display of a separate 2-D image behind each momentarily open aperture.* Apertures are *sequenced* in a cyclic manner, the period of each cycle being less than the persistence of vision threshold of human sight."

Furthermore, as discussed above, the images displayed on the display screen for each aperture plate opening must be changed, and the changing of the images is the sequencing of the display screen. With regard to the aperture plate sequencing, each aperture plate opening and closing must be controlled, and the controlling of the order or opening and closing of the aperture plates is also sequencing.

Thus, withdrawal of this objection is respectfully requested.

Objection to the term "slit apertures"

The Examiner has objected to the recitation of "producing slit apertures" in claim 5. Claim 5 has been amended to recite that the aperture plate is capable of "producing vertical slit aperture *openings* having a slit width"

Thus, withdrawal of this objection is respectfully requested.

Examiner states that Claim 9 is wrong.

The Examiner states that "If the aperture plate has a number of apertures that equals the number of the number of the pixels then the aperture plate essentially has no function, since all of the image light from all of the pixels will just pass through the aperture plate and no three-dimensional display will be achieved."

As discussed above, the aperture plate only opens a single aperture in a aperture plate scanning region at a time, thus, forcing a viewer to view only a portion of the display screen through the open apertures. The Examiner appears to believe that all of the apertures would be open at the same time, resulting in a transparent shield over the display screen. Having an equal number of apertures in relation to the resolution of the display screen does not require that all of the apertures be open at the same time.

In light of the above clarification, and in addition to the previous remarks, withdrawal of this objection is respectfully requested.

The Examiner has objected to the term "Solid state scan type"

The Examiner has objected to the use of the word "type" when referring to the solid state solid state scan type aperture plate. However, the usual indefiniteness of this term is cured by the explicit definition given in the specification at page 16, line 10 through page 17, line 3. In light of the above clarification, and in addition to the previous remarks, withdrawal of this objection is respectfully requested.

The Examiner has objected to claim 41 for indefiniteness

The Examiner has objected to the phrase "a number of vertical viewing angles is less than a number of viewing angles". Claim 41was previously amended to recite "a number of vertical viewing angles is less than a number of *horizontal* viewing angles", and not the verbiage quoted by the Examiner. Thus, the basis for this objection was previously removed. Therefore, withdrawal of this objection is respectfully requested.

The Examiner does not understand the term "solid state"

The Examiner has objected to the use of the term "solid state" claiming that it is unclear what the term refers to. The term "solid state" in the phrase "a solid state three dimensional display device" can only refer to the device being solid state. As discussed in the previous Office Action Response, the term solid state means having no moving parts. The term solid state is defined in the specification as filed, particularly at page 10, lines 10-11, which state: "The embodiment of Figure 1 is a solid state example of the invention, having no moving parts." As the Examiner may notice, the device contemplated by the present principles is electronic, and the term solid state indicates that the device itself has no moving parts in the sense of a solid state display.

In light of the foregoing remarks, and the remarks of the previous Office Action response, Applicant respectfully requests the withdrawal of this objection.

Objection to the term "hybrid screen"

Clarifications to the Examiner's understanding of the term "hybrid screen" have been discussed above, and will be omitted here for the sake of brevity. In light of the

prior discussion regarding the term "hybrid screen", and the remarks of the previous Office Action response, Applicant respectfully requests the withdrawal of this objection.

Examiner objects to the use of the term "capable of"

The Examiner states that "[t]he phrase capable of recited in various claims is confusing and indefinite", and cited *In re Hutchison* for the proposition that use of the term capable of prevents patentability. However, under *Hutchison* and its progeny, the use of a term describing the configuration or capabilities of an element does not automatically bar the patentability of the claim. As long as the metes and bounds of the claim may be ascertained, the claim is definite enough for patentability.

Here, the use of the term "capable of" describes, in claim 5, the aperture plate capable of producing a slit aperture opening. Furthermore, claim 11 describes the resolution of the display screen being capable of displaying at least 8 viewing angles. Both of these claims use the term "capable of" in such a way as to describe the limitations of the respective elements. Thus, the metes and bounds of the elements are easily determinable.

Applicant, therefore, respectfully requests the withdrawal of the Examiner's objection to the use of the term "capable of".

Claims 1-20 stand rejected under 35 U.S.C. §103(a).

The Examiner has rejected claims 1-20 as obvious over the patent issued to Harrold (U.S. Patent No. 5,969,850).

Applicant notes that the Examiner's current rejection of claims 1-20 under Harrold are recited verbatim to the rejections of the Office Action dated May 26, 2006. Furthermore, the Applicant draws the Examiner's attention to the fact that the Examiner has failed to address any of the remarks presented in the Office Action Resonse of September 22, 2006. The Applicant respectfully requests the complete consideration of the remarks and amendments made in the Response of September 22, 2006. Furthermore, Applicant strongly reiterates the remarks presented in the September 22, 2006 Office Action Response as to the inapplicability of Harrold as an obviating reference under §103(a).

Applicant respectfully submits the following additional arguments in support of the patentability of claims 1-20 over Harrold.

Claim 1, as presently amended, recites that "the three dimensional display provides multiple *different perspectives* of a displayed 3D image *simultaneously* viewable from *respective multiple different user viewing angles*." Thus, each user viewing angle provides a separate, different perspective of the displayed three dimensional image.

In contrast, Harrold is more similar to traditional stereoscopy than the present principles as recited in claim 1. In particular, column 12, lines 52-58 of Harrold states "FIG. 34 illustrates an arrangement comprising spatial and temporal multiplexing to provide four viewing windows 72 to 75. During each field two spatially multiplexed 2D images are displayed by the SLM 1."

Harrold makes use of a parallax barrier aperture plate similar to that of the claim 1, but the parallax barrier of Harrold opens apertures based on the *location of the viewer*, and merely causes the viewer to have an increased range of location with respect to the display,

allowing the viewer the same viewed perspective of the image regardless of location. Specifically, column 10, lines 29-35 of Harrold states that "[t]he display shown in FIG. 16 may be used to track movement of an observer so that the viewing zones or windows are maintained at the eyes of the observer, who may therefore perceive a 3D image throughout an enlarged viewing region compared with untracked displays. The pixels of the LCD 2 are controlled in response to the position of the observer as detected by an observer tracking system." Thus, it can be sent that the parallax barrier of Harrold serves to focus the single perspective of the displayed image in a particular direction instead of providing multiple different perspectives of the displayed image. Furthermore, by providing only two different perspective images, one for each viewer eye to form a single perceived perspective, a viewer could never perceive any other image perspective other than the one created by the combination of the two displayed perspectives.

Harrold cannot, therefore, obviate at least the element of a display that "provides multiple *different perspectives* of a displayed 3D image *simultaneously* viewable from *respective multiple different user viewing angles*." Furthermore, Harrold teaches away from the principles as claimed in claim 1, by requiring the movement of the parallax barrier with respect to the viewer's head.

Therefore, Applicant believes that Claim 1 is patentable over Harrold for at least the reasons stated above, and the reasons previously presented in the Office Action Response of September 22, 2006. Furthermore, claims 2-20 depend from independent claim 1, and have at least the same limitations and features as recited in claim 1. Claims 2-20 are thus patentable for at least the reasons stated for independent claim 1. Applicant respectfully requests the withdrawal of the Examiner's §103(a) rejection for claims 1-20.

Claims 21-52 and 57-81 stand rejected under 35 U.S.C. 103(a)

The Examiner has rejected claims 21-52 and 57-81 over Harrold in view of Aritake (United States Patent No. 6,061,083) and Isono (United States patent No. 5,315,377).

Again, Applicant reiterates the above and previously presented arguments regarding the failure of Harrold to teach, or even suggest, a system for providing "multiple different perspectives of a displayed 3D image which are *simultaneously viewable* from respective multiple different user viewing angles *with respect to an open aperture*" as recited in independent claim 21. Independent claims 42, 57, 68 and 76 also recite analogous elements providing multiple different perspectives of a displayed 3D image which are simultaneously viewable from respective multiple different user viewing angles with respect to an open aperture. Thus, Harrold would not teach, anticipate, or even suggest at least one element of these claims as well.

The combination of Aritake and Isono also fails to teach the elements where Harrold is deficient. In particular, none of the cited references teaches or suggests any way to achieve multiple perspectives of the three dimensional image *with respect to an open aperture.*

Aritake discloses a system where a single pixel is shown at a time, each pixel having an associated aperture opening. A single pixel is thus viewable whenever a single aperture is opened. The single pixel can only show a single visual datum point, preventing multiple users from perceiving different perspectives, as all users viewing visual data from the single pixel, through the associated open shutter will perceive the same data. Thus, under Aritake, only one perspective is viewable *with respect to an open aperture.*

Isono, like Harrold, fails to teach, or even suggest the ability to provide multiple perspectives with respect to the parallax barrier, or aperture, opening. Isono is directed to a system for achieving a greater viewing range of a selected image perspective, and not to providing simultaneous perspectives of a three dimensional image. In particular, Isono relies on a viewer tracking method similar to that of Harrold to direct and focus the three dimensional image. Isono particularly states at col 11, lines 36-46 that "[t]he detecting unit 8 detects the head position of the viewer by using a sensor of infrared rays, magnetism, or the like. When the right eye OR is at the position as shown in FIG. 2, the image elements R.sub.1, R.sub.3, R.sub.5, . . . are observed through the aperture slits by the right eye OR. However, when the right eye OR moves to the position of the left eye in FIG. 2, that is, when the head position of the viewer moves by the distance E (about 6.5 cm) between both eyes, image elements L.sub.2, L.sub.4, L.sub.6, . . . can be observed through the aperture slits. When the movement of the head position is detected, the detecting unit 8 generates a barrier phase shift command to the computer 20. In response to the barrier phase shift command, the computer 20 controls the controller 22 so as to shift the position of the stripe barrier by a distance corresponding to one image element." Since Isono requires the tracking of a viewer's head to arrange the open aperture slits to focus the desired visual data to the viewer, multiple simultaneous multiple perspectives of the three dimensional image would not be possible. For example, when two viewers occupy different viewing spaces, the first viewer will have the apertures aligned so that the three dimensional image is properly projected to the first viewer. However, the second viewer will perceive the parallax barrier openings misaligned, and will not be able to view the three dimensional image at all, much less from a

different perspective, as the display area showing the desired visual data would be obscured by the misaligned parallax barriers that are *not* open.

Thus, taken singly, or in any combination, Harrold, Isono, and Aritake fail to teach, or suggest, or render obvious at least the feature of providing "multiple different perspectives of a displayed 3D image which are simultaneously viewable from respective multiple different user viewing angles with respect to an open aperture" as recited in claim 21. Likewise, the cited prior art applications fail to teach, suggest, or render obvious the analogous elements recited in claims 42, 57, 68 and 76. Furthermore, claims 22-41 depend from independent claim 21, claims 23-52 depend from independent claim 42, claims 48-67 depend from independent claim 68, and claims 77-81 depend from independent claim 76, and are, thus, patentable for at least the same reasons as independent claims 21, 42, 57, 68 and 76, respectively. In light of the above clarifications and remarks, the Applicant respectfully requests the withdrawal of the Examiner's §103(a) rejection of claims 21-52 and 57-81.

Claims 1-20 currently stand rejected under 35 U.S.C. 103(a)

The Examiner has rejected claims 1-20 in light of Isono.

Applicant respectfully reiterates the remarks presented above regarding the failure of Isono to disclose, or even remotely suggest, "multiple different perspectives of a displayed 3D image *simultaneously* viewable from respective multiple different user viewing angles" as recited in claim 1. Again, the head tracking system required by Isono limits the system to a single viewer, eliminating the possibility that multiple perspectives will be simultaneously viewable.

The Applicant respectfully asserts that claim 1 is patentable over Isono for at least the above reasons. Furthermore, claims 2-20 depend from independent claim 1, and are patentable for at least the same reasons as discussed for independent claim 1. Therefore, Applicant respectfully requests the withdrawal of the Examiner's §103(a) rejection in view of Isono of claims 1-20.

Conclusion

Based on the foregoing discussions and clarifications, reconsideration and withdrawal of the rejections is respectfully requested, and the application be passed to allowance, and letters patent issued in due course.

In the event that any additional fees or charges are required at this time in connection with the application, they may be charged to applicant's representatives Deposit Account No. 50-1433.

Respectfully submitted,
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Dated: April 4, 2007